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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,315	10/24/2001	Gregory D. VanWiggeren	10010111-1	2348

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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/001,315	VANWIGGEREN ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6,8-12,14 and 17-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6, 8-12, 14 and 17-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's *appeal brief* filed on May 24, 2004, which has been entered into file.
- Claims 2-6, 8-12, 14, and 17-23 remain pending in this application.
- In light of applicant's arguments presented in the appeal brief, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2-6, 8-11, 12, 14 and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Popovich (PN. 6,356,366) in view of the patent issued to De Vre et al (PN. 5,640,256).

Popovich teaches a *holographic light focusing device* that is comprised of a *light focusing system* (12, Figure 1), serves as *the optical device*, wherein the light focusing system includes a *first switchable holographic optical element* (26), serves as the *first hologram* in a first hologram medium, that is capable of being **switchable** between *a first active state* for diffracting and *focusing* the incident light to a *first location* (Q, Figure 1), which is an *off-axis direction* with respect to the optical axis of the first hologram, and a first passive state wherein the incident light is not diffracted but passes through along a second direction in general *along* the optical axis. Popovich further teaches that the light focusing system comprises a second switchable holographic optical element (such as 28 or 30), wherein the second

switchable holographic element is **switchable** between a *second active* state for diffracting and focusing the incident light to a *second location* (or third location) (such as Y and Z, Figure 1), that is *along* the optical axis of the light focusing system and a second passive state for not diffracting the light.

This reference has met all the limitations of the claims. Popovich teaches that the holographic medium is a dispersed liquid crystal medium, wherein the dispersed liquid crystal molecules may be switched to have different optical orientations by applying electrical field across. It is known in the art that the application of the electrical field therefore *controls* the refractive index of the liquid crystal medium so that the recorded holographic Bragg grating within can be activated or deactivated by controlling the application of the electrical field. Popovich however does not teach *explicitly* that the holographic medium is a *para-electric* holographic medium. **De Vre et al** in the same field of endeavor teaches a switchable hologram that is recorded in a *para-electric holographic* medium, such as photorefractive crystal ($LiNbO_3$ or SBN), which is also a *refractive index controlled medium* when under the application of electrical field, (please see column 5, lines 40-45, column 9, lines 40-51). De Vre et al teaches that the recorded holographic grating is activated to have diffractive function when a *non-zero electrical field* is applied across the holographic medium, (please see column 9, lines 45-60). It would then have been obvious to one skilled in the art to apply the teachings of De Vre et al to modify the holographic medium of Popovich, which is an *electrically controllable refractive index medium*, to use a *para-electric medium* with holographic grating stored within for the benefit of providing an alternative design and structure for the switchable holographic light focusing system for the benefit of providing an alternative index-controllable recording medium that has enhanced diffraction efficiency, (please see column 9, lines 40-65). Furthermore, it has also been held it is within the general skill of a worker in the art to select a known material, (i.e. one index-controllable medium verse the other index-controllable medium) on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claims 5-6, and 17, Popovich teaches that each of the holographic optical elements (26, 28 and 30), comprises a hologram recorded within a holographic recording medium such as photopolymeric film that is interposed between a pair of *electrodes* (60) such that an electric circuit (68) is used to drive electrical field across the electrodes and therefore the holographic recording medium for switching the hologram, (please see Figure 3 and column 4, lines 44-67).

Popovich further teaches that the holographic light-focusing device could be used within an endoscope such that light transmission medium including *optical fiber* (48) could be used to transmit the light to the holographic light-focusing device. Although it does not teach explicitly to use output transmission medium such as optical fibers to receive the light at different locations, such modification would have been obvious to one skilled in the art for the benefit of directing the light to further desired locations since optical fibers are well known light transmission means in the art.

3. Claims 2, 5, 6, 12, 17-19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to De Vre et al (PN. 5,640,256).

De Vre et al teaches a *switchable holographic optical element* (SVHOE, 10 Figures 7-8 or 60, Figures 14 and 15) serves as *the optical device*, wherein the holographic optical element includes a *first para-electric holographic medium* (first medium 12 in Figure 7-8 or first medium 78 in Figures 14-15), that stores a *first Bragg grating* as the *first hologram* in the medium, wherein the first hologram can be **switchable** between *a first active state* for *diffracting* the component of incident light (18 or 90) that satisfies the Bragg condition of the first stored Bragg grating to a *first location* (S^1, Figures 8 or 15), which is an *off-axis direction* with respect to the optical axis of the first hologram, and a first passive state wherein the incident light is *not* diffracted but passes through along a second direction to a *second location* that is along the original propagation direction of the incident light beam, (18 or 90). De Vre further teaches (with regard to claim 18) that the holographic optical element comprises a *second para-*

electric holographic medium (such as second para-electric layer of 12 in Figures 7-8 or second para-electric layer of 78 in Figures 14-15), with a second Bragg grating recorded as a *second hologram* wherein the second hologram is **switchable** between a *second active state* for *diffracting* the incident light to a *third location* (such as S^2, Figures 8 or 15) that is different from the second location, (which is along the propagation direction of the incident light 18 or 90). As demonstrated in Figures 8 and 15, the *second* para-electric holographic medium is capable of directing the diffracted light (S^1) from the first para-electric medium to the first location.

The holographic optical element (SVHOE) as described above and as *clearly* demonstrated by Figures 8 and 15, operates as a **switch** that is able to *selectively direct* light between the *first location* (S^1 etc.) and the *second location* (the original propagation direction) and De Vre teaches that the holographic optical element may be utilized in a wavelength divisional multiplex (WDM) communication system, (please see column 1), which implicitly involves optical information signal light beam, (with regard also to claim 23).

This reference has met all the limitations of the claims with exception that it does not teach explicitly that the second location (or the original beam propagation direction) is along the optical axis of the holographic optical element or defined by the first para-electric medium. However De Vre teaches **explicitly** that the Bragg grating holograms are recorded by directing a set of reference beam (62) and signal beam (64, Figure 13) to the medium and the diffraction condition is determined solely by the vector summations of the wave vectors of the signal beam and the reference beam, (as shown in Figure 5A). This means one skilled in the art can design to have one of the reference beam or signal beam direct along the optical axis of the element while recording the Bragg grating hologram which will then make the diffracted beam, by the hologram, directed to locations off the optical axis and the non-diffracted beam to a location that is along the optical axis, for the benefit of making the holographic optical element having a desired output arrangement. One skilled in the art would understand that setting the directions of the

propagation of the diffracted or non-diffracted light by selecting the directions of the recording signal and reference light beams in diffraction theory is a conventional knowledge in the art and is really an obvious matters of design choice to set such directions.

With regard to claims 5-6 and 17, De Vre teaches that a pair of electrodes (14A and 14B, in Figures 2 and 8 or 76 in Figure 14) is placed approximated to the first para-electric hologram medium to apply the electrical filed across the medium and a control unit (26 in Figure 2 or 92 in Figure 14) is used to control the application of the electrical field. With regard to claim 19, the first para-electrical hologram medium is set at first active state as shown in Figures 8 and 15.

Response to Arguments

4. Applicant's arguments provided in the appeal brief with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

5. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both Popovich and De Vre references teach to use refractive index-controllable medium to record the hologram and use electrical field to switch the hologram between active state that diffracts light to a first off axis location and non-active state that direct light to a second location. Both refractive index-controllable media, dispersed polymer liquid crystal and para-electric medium, are all well known holographic recording media in the art, to replace one with respect to the other is considered to be within general skill in the art and De Vre et al reference teaches the para-electric medium has enhanced diffraction efficiency with relative small voltage application,

(please see column 9, lines 40-65). These provide motivations for one skilled in the art to select the desired hologram medium to achieve the desired needs.

6. In response to applicant's arguments, which states that the cited De Vre reference teaches the holographic optical element to be an *optical filter* rather than a *switch*, as claimed by the applicant, which therefore differs from the instant application, the examiner respectfully disagrees for the reasons stated below. **De Vre et al** teaches the **switchable** holographic optical element (SVHOE) including the *first para-electric holographic medium* having the *first hologram* recorded therein, is capable of being **switched** between *a first active state* for *diffracting* the component of incident light that satisfies the Bragg condition of the first stored Bragg hologram grating to a *first location* (S^1, Figures 8 or 15), which is an *off-axis direction* with respect to the optical axis of the first hologram, and a first passive state wherein the incident light is *not* diffracted but passes through along a second direction to a second location that is along the original propagation direction of the incident light beam, (18 or 90). This satisfies **explicitly** as the *"switch" function* defined in the claims and the specification, (please see claim 2). De Vre further teaches that the switchable holographic element may be utilized in a wavelength divisional multiplex communication system, which implicitly operates with information signal light beam. The applicant is respectfully noted that the nature of the light beam, (i.e. whether with or without information), **does not** effect the "switching" or diffraction function of the holographic optical element. The holographic optical element of De Vre therefore operates as a switch, just as the same as the optical device in the instant application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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